

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 22 NOV 2001

Applicant's or agent's file reference 7604/21	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/23057	International filing date (day/month/year) 23 August 2000 (23.08.2000)	Priority date (day/month/year) 23 August 1999 (23.08.1999)
International Patent Classification (IPC) or national classification and IPC IPC(7): G01B 9/02; G01H 9/00, 13/00; G01N 29/12 and US Cl.: 73/656, 657; 356/347, 358, 357		
Applicant THE TRUSTEES OF THE STEVENS INSTITUTE OF TECHNOLOGY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 21 February 2001 (21.02.2001)	Date of completion of this report 15 October 2001 (15.10.2001)
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer ROSE MILLER Telephone No. (703) 308-0956 <i>Renee Paxton</i>

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/23057

**I. Basis of the report**

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed.
- ☒ the description:  
pages 1-10 as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the claims:  
pages 11-14, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the drawings:  
pages 1-4, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/US00/23057**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims <u>Please See Continuation Sheet</u>	YES
	Claims <u>Please See Continuation Sheet</u>	NO
Inventive Step (IS)	Claims <u>Please See Continuation Sheet</u>	YES
	Claims <u>Please See Continuation Sheet</u>	NO
Industrial Applicability (IA)	Claims <u>Please See Continuation Sheet</u>	YES
	Claims <u>Please See Continuation Sheet</u>	NO

**2. CITATIONS AND EXPLANATIONS**

Claims 1-4, 11, 14, 21, 24, 32-33, and 35 lack novelty under PCT Article 33(2) as being anticipated by Kljuev et al. (US 4,481,825). Kljuev clearly discloses a device which utilizes microwaves to detect or measure vibrations in an object.

Claims 1, 7, 8, 11, 17, 18, 21, 22, 27, 28, 32, 33, and 38-40 lack novelty under PCT Article 33(2) as being anticipated by Rudd (US 4,554,836). Rudd clearly teaches a vibrometer which utilizes laser or light to determine the vibration of a test object.

Claims 1, 7, 8, 11, 17, 18, 27, 28, 32, and 38-40 lack novelty under PCT Article 33(2) as being anticipated by Sugimoto (US 4,768,381). Sugimoto clearly discloses an optical vibrometer for determining the vibrations of a test object.

Claims 5, 15, 25, and 36 lack an inventive step under PCT Article 33(3) as being obvious over Kljuev in view of Sugimoto. Kljuev discloses a device which utilizes microwaves to detect or measure vibrations in an object. Sugimoto discloses an optical vibrometer for determining the vibrations of a test object. One of ordinary skill in the art knows that to provide more than one test improves the quality of the test result. Therefore, one knowledgeable in the art would utilize both the systems of Kljuev and Sugimoto to improve the quality of test being performed.

Claims 5, 15, 25 and 36 meet the criteria for novelty under PCT Article 33(2), because no single reference teaches the combination of using both microwave and optical test apparatus.

Claims 6, 16, 26, and 37 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest an electromagnetic wave vibrometer utilizing both optical and microwave detection signals wherein the optical signal is modulated with the same frequency as the transmitted microwave signal.

Claims 9-10, 19-20, 30-31, and 42-43 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest an electromagnetic wave vibrometer utilizing a second vibration receiver mounted with the first receiver for compensation for unwanted background or coupled vibration.

Claims 12-13 and 23-34 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest an electromagnetic wave vibrometer utilizing an optical signal which is amplitude modulated.

Claims 29 and 41 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest an electromagnetic wave vibrometer utilizing compensation for the vibration displacements of the receiver and transmitter.

Claims 1-5, 7, 8, 11, 14, 15, 17, 18, 21, 22, 24, 25, 27, 28, 32, 33, 35, 36, 38-40 meet the criteria of industrial applicability as defined by PCT Article 33(4).

----- NEW CITATIONS -----  
NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/US00/23057

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

**V.1. Reasoned Statements:**

The opinion as to Novelty was positive (Yes) with respect to claims 5, 6, 9, 10, 12, 13, 15, 16, 19, 20, 23, 25, 26, 29-31, 34, 36, 37, 41-43

The opinion as to Novelty was negative (No) with respect to claims 1-4, 7, 8, 11, 14, 17, 18, 21, 22, 24, 27, 28, 32, 33, 35, 38-40

The opinion as to Inventive Step was positive (Yes) with respect to claims 6, 9, 10, 12, 13, 16, 19, 20, 23, 26, 29-31, 34, 37, 41-43

The opinion as to Inventive Step was negative (NO) with respect to claims 1-5, 7, 8, 11, 14, 15, 17, 18, 21, 22, 24, 25, 27, 28, 32, 33, 35, 36, 38-40

The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-43

The opinion as to Industrial Applicability was negative (NO) with respect to claims NONE

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/23057

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01B 9/02; G01H 9/00, 13/00; G01N 29/12

US CL : 73/656, 657; 356/347, 358, 357

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 73/656, 657, 655, 594, 800, 601, 582, 659, 643; 356/347, 358, 357, 349, 35.5, 346, 348

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,481,825 A (KLJUEV ET AL.) 13 November 1984 (13.11.1984), abstract, Figures, column 2 line 1 - column 3 line 2.	1, 4, 11, 14, 21, 24, 32, 35 ----- 5, 15, 25, 36
X --- A	US 4,554,836 A (RUDD) 26 November 1985 (26.11.1985) see abstract, Figures, column 1 line 42 - column 2 line 9.	1, 7-8, 11, 17-18, 21-22, 27-28, 32-33, 38-39, 40 ----- 2-6, 12-16, 19-20, 23-26, 29-31, 34-37, 41-43
X --- Y	US 4,768,381 A (SUGIMOTO) 6 September 1988 (06.09.1988) see abstract, Figures, column 1 line 60 - column 2 line 15.	1, 7-8, 11, 17-18, 21, 27-28, 32, 38-40 ----- 5, 15, 25, 36

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

08 November 2000 (08.11.2000)

Date of mailing of the international search report

10 JAN 2001

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**Published:**

- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*